

WHAT IS CLAIMED IS:

1. A semiconductor device for a receiver having a reference oscillator, wherein the receiver uses a reference signal generated by the reference oscillator to receive a signal in a predetermined channel bandwidth, the semiconductor device comprising:

a local oscillator for generating a local signal having a local frequency;

10 a PLL controller connected to the local oscillator for controlling the local frequency in accordance with the reference signal to set the channel bandwidth; and

15 a comparator connected to the local oscillator for comparing frequency of the received signal with frequency of the reference signal or phase of the received signal with phase of the reference signal and generating an error signal in accordance with the comparison to correct the local frequency.

20 2. The semiconductor device according to claim 1, further comprising:

25 a demodulator for demodulating the received signal to generate a carrier signal, wherein the comparator compares frequency of the carrier signal with frequency of the reference signal or phase of the carrier signal with phase of the reference signal to generate the error signal in accordance with the comparison.

30 3. The semiconductor device according to claim 1, wherein the receiver is provided with a transmitting function, and the local oscillator functions as a modulator when the receiver transmits a signal.

4. The semiconductor device according to claim 1,
further comprising:

a signal generator for generating a modulation signal
having a frequency corresponding to the error signal; and
5 a quadrature modulator connected to the signal
generator and the local oscillator to modulate the local
signal with the modulation signal.

5. The semiconductor device according to claim 4,
10 wherein the receiver is provided with a transmitting
function, and the quadrature modulator functions as a
modulator when the receiver transmits a signal.

6. A semiconductor device for a receiver having a
15 reference oscillator, wherein the receiver uses a reference
signal generated by the reference oscillator to receive a
signal in a predetermined channel bandwidth, the
semiconductor device comprising:

a local oscillator for generating a local signal;
20 a first control loop including the local oscillator for
controlling a frequency of the local signal based on the
reference signal to set the channel bandwidth; and
a second control loop including the local oscillator
for comparing frequency of the received signal with
25 frequency of the reference signal or phase of the received
signal with phase of the reference signal and generating an
error signal in accordance with the comparison to correct
the local frequency.

30 7. The semiconductor device according to claim 6,
further comprising:

a loop switching circuit connected to the local
oscillator to selectively validate the first control loop

and the second control loop, wherein the loop switching circuit invalidates the first control loop and validates the second control loop after setting the channel bandwidth with the first control loop.

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8. The semiconductor device according to claim 6, wherein the receiver includes a band pass filter for setting a channel bandwidth of the received signal, the semiconductor device further comprising:

10 a frequency controller connected to the band pass filter to set a center frequency of the band pass filter to a frequency corresponding to the channel bandwidth in accordance with the reference signal before the second control loop corrects the local frequency.

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9. A semiconductor device for a receiver having a reference oscillator, wherein the receiver uses a reference signal generated by the reference oscillator to receive a signal of a predetermined channel, the semiconductor device 20 comprising:

a local oscillator for generating a local signal;
a mixer connected to the local oscillator for generating an intermediate frequency signal having a predetermined intermediate frequency with the local signal
25 and the received signal;

a PLL controller connected to the local oscillator for setting a frequency of the local signal with the reference signal to receive the received signal of the predetermined channel; and

30 a comparator connected to the local oscillator for comparing a frequency of the intermediate frequency signal with frequency of the reference signal or phase of the intermediate frequency signal with phase of the reference

signal and generating an error signal in accordance with the comparison to correct the frequency of the local signal.

10. The semiconductor device according to claim 9,
5 further comprising:

a band pass filter connected to the mixer, wherein the band pass filter has a predetermined passage bandwidth through which the intermediate frequency signal passes; and

10 a demodulator connected to the band pass filter for demodulating the intermediate frequency signal to generate a carrier signal, wherein the comparator compares frequency of the carrier signal with frequency of the reference signal or phase of the carrier signal with phase of the reference signal and generates the error signal in accordance with the
15 comparison to correct the frequency of the local signal.

11. The semiconductor device according to claim 10,
further comprising:

20 a divider connected to the reference oscillator for dividing the reference signal to generate a divisional reference signal, wherein the comparator compares frequency of the carrier signal with frequency of the divisional reference signal or phase of the carrier signal with phase of the divisional reference signal and generates the error
25 signal in accordance with the comparison to correct the frequency of the local signal.

12. The semiconductor device according to claim 10,
further comprising:

30 a frequency controller connected to the band pass filter and the reference oscillator to set a center frequency of the band pass filter to the intermediate frequency with the reference signal.

13. The semiconductor device according to claim 9,
further comprising:

a switching circuit connected to the local oscillator
5 to selectively connect the PLL control circuit and the
comparator to the local oscillator.

14. The semiconductor device according to claim 9,
wherein the receiver is provided with a transmitting
10 function, and the local oscillator functions as a modulator
when the receiver transmits a signal.

15. A receiver for receiving a signal, the receiver
comprising:

15 a reference oscillator for generating a reference
frequency signal having a reference frequency;
a local oscillator for generating a local signal;
a band pass filter having a predetermined passage
bandwidth;
20 a channel setting circuit connected to the reference
oscillator and the local oscillator for controlling
frequency of the local signal in accordance with the
reference frequency signal and setting the passage bandwidth
of the band pass filter to a predetermined channel
25 bandwidth; and
a frequency correction circuit for comparing frequency
of the received signal received in the channel bandwidth
with frequency of the reference signal or phase of the
received signal with phase of the reference signal and
30 generating an error signal in accordance with the comparison
to correct the frequency of the local signal.

16. A method for correcting frequency of a local

signal in a receiver, wherein the receiver includes a reference oscillator for generating a reference signal having a reference frequency, and a band pass filter, the method comprising:

- 5 setting a center frequency of the band pass filter with the reference signal;
- generating a local signal for receiving a received signal of a predetermined channel with the reference signal;
- generating an intermediate frequency signal having a predetermined intermediate frequency with the received signal and the local signal;
- 10 providing the intermediate frequency signal to the band pass filter;
- generating an error signal in accordance with a comparison between frequency of the intermediate frequency signal that passed through the band pass filter and frequency of the reference signal or a comparison between phase of the intermediate frequency signal with phase of the reference signal; and
- 15 correcting the frequency of the local signal in accordance with the error signal.

17. The method according to claim 16, wherein said setting a center frequency includes setting the center frequency to the predetermined intermediate frequency.

18. The method according to claim 17, further comprising:

- 30 generating a carrier signal by demodulating the intermediate frequency signal, wherein said generating an error signal includes comparing frequency of the carrier signal with frequency of the reference signal or phase of the carrier signal with phase of the reference signal to

generate the error signal in accordance with the comparison.

19. The method according to claim 18, further comprising:

5 generating a divisional reference signal by dividing the reference signal, wherein said generating an error signal includes comparing frequency of the carrier signal with frequency of the divisional reference signal or phase of the carrier signal with phase of the divisional reference
10 signal to generate the error signal in accordance with the comparison.